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Professor John Moody

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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Dept of Computer Science
New Haven CT 06511

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This project addressed three fundamental areas in statistical learning theory and algorithms: (1) a practical and theoretically sound mehtod or estimating generalization performance of nonlinear learning systems (Generalized Prediction Error, GPE), (2) a more powerful and efficient class of network architectures (Parameterized Projection Pursuit Regression (P(3)R) Networks), and (3) faster real-time learning methods based on asymptotically optimal stochastic gradient search. Three papers were published under this grant. Additionally, a graduate student finished his PhD under research topic "Networks with Learned Unit Response Functions".

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Final Report:
Statistical Learning Theory and Algorithms
AFOSR Grant F49620-92-J-0143

John E. Moody, PI
Computer Science, Oregon Graduate Institute
formerly: Computer Science, Yale University

This project addressed three fundamental areas in statistical learning theory and algorithms:

1. a practical and theoretically sound method for estimating generalization performance of nonlinear learning systems (Generalized Prediction Error (GPE)),
2. a more powerful and efficient class of network architectures (Parametrized Projection Pursuit Regression (P^3R) Networks), and
3. faster real-time learning methods based on asymptotically optimal stochastic gradient search.

Under the sponsorship of this grant, my research group published the following papers:

"The *Effective* Number of Parameters: an Analysis of Generalization and Regularization in Nonlinear Learning Systems", John Moody, in Advances in Neural Information Processing Systems 4, Moody, Hanson, and Lippmann, eds., Morgan Kaufmann. Palo Alto, (1992).

"Towards Faster Stochastic Gradient Search" Christian Darken and John Moody, in Advances in Neural Information Processing Systems 4, Moody, Hanson, and Lippmann, eds., Morgan Kaufmann, Palo Alto, (1992).

"Networks with Learned Unit Response Functions" John Moody and Norman Yarvin, in Advances in Neural Information Processing Systems 4, Moody, Hanson, and Lippmann, eds., Morgan Kaufmann. Palo Alto, (1992).

Additionally, Christian Darken finished his Ph.D. research on topic (3). He presented his thesis work at the Neural Networks and Signal Processing Conference in Copenhagen in September 1992 (right after the keynote speech by the renowned Lennart Ljung) and successfully defended his Ph.D.dissertation at Yale in October 1992.